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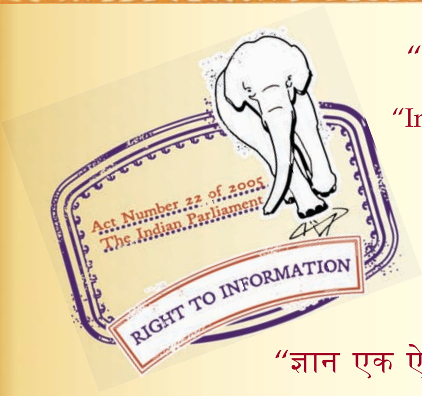
IS 12482 (1988): Methods of test for manually operated dusters [FAD 21: Farm Implements and Machinery]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AMENDMENT NO. 1 NOVEMBER 1997
TO
IS 12482 : 1988 METHODS OF TEST FOR MANUALLY OPERATED DUSTERS

(*Page* 3, *clause* 5.4.1, *last sentence*) — Delete.

(FAD 59)

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Indian Standard

METHODS OF TEST FOR MANUALLY OPERATED DUSTERS

Crop Protection Equipment Sectional Committee, AFDC 43 [Ref : Doc : AFDC 43 (2799)]

1. Scope — Prescribes the methods for testing of performance and durability of the following types of manually operated dusters:

- a) Belly mounted type, and
- b) Shoulder mounted type.

2. Sampling and Running-in

2.1 *Sampling* — The dusters for certification or for commercial test report shall be selected by the certifying or testing authorities from the production lot. The duster shall be new and shall be in a condition generally offered for sale. For confidential test report, the manufacturers may submit the sample to testing authority. The manufacturer shall supply all the relevant necessary information for conducting the test.

2.2 *Running-in* — In order to overcome the variation in initial performance, the duster may be run-in before the start of the actual test. The lubrication and adjustment of components shall be done in accordance with the manufacturer's recommendations.

3. Tests

3.1 Relevant tests/observations, from the following, shall be made in the dusters.

3.1.1 *General tests* (*see* 4)

- a) Visual examination (*see* 4.1),
- b) Checking of dimensions (*see* 4.2), and
- c) Checking of material of construction (*see* 4.3).

3.1.2 *Performance tests* (*see* 5)

- a) Air output (*see* 5.1),
- b) Dust delivery (*see* 5.2),
- c) Dust throw (*see* 5.3), and
- d) Leakage (*see* 5.4).

3.1.3 *Test for components* (*see* 6)

- a) Agitation (*see* 6.1),
- b) Dust feed control mechanism (*see* 6.2), and
- c) Strap and its assembly (*see* 6.3).

4. General Tests

4.1 *Visual Examination* — The equipment shall be visually examined with respect to the requirements given in relevant Indian Standard. Conformity or otherwise of the requirements shall be reported.

4.2 *Checking of Dimensions* — Dimensional requirements given in the relevant Indian Standard shall be measured and reported. Conformity or otherwise of the dimensions for various components given in the relevant Indian Standard shall also be reported.

4.3 *Checking of Material of Construction* — The material of construction of various parts of the duster shall be checked and reported. Conformity or otherwise of the material for various components given in relevant Indian Standard shall also be reported.

Adopted 30 September 1988

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

5. Performance Test

5.1 *Test for Air Output*

5.1.0 The air output shall be tested by pitot tube method.

5.1.1 Connect the blower fan outlet of the duster with a pipe, having diameter equal to the diameter of the blower fan outlet, through a hose coupling. Ensure that the connection is leak proof. The length of the pipe shall be eight times the diameter of the pipe. Insert the pitot tube into the centre of this pipe at a distance, from the end, twice the diameter of the pipe. Connect the pitot tube with the manometer (*see* Fig. 1).

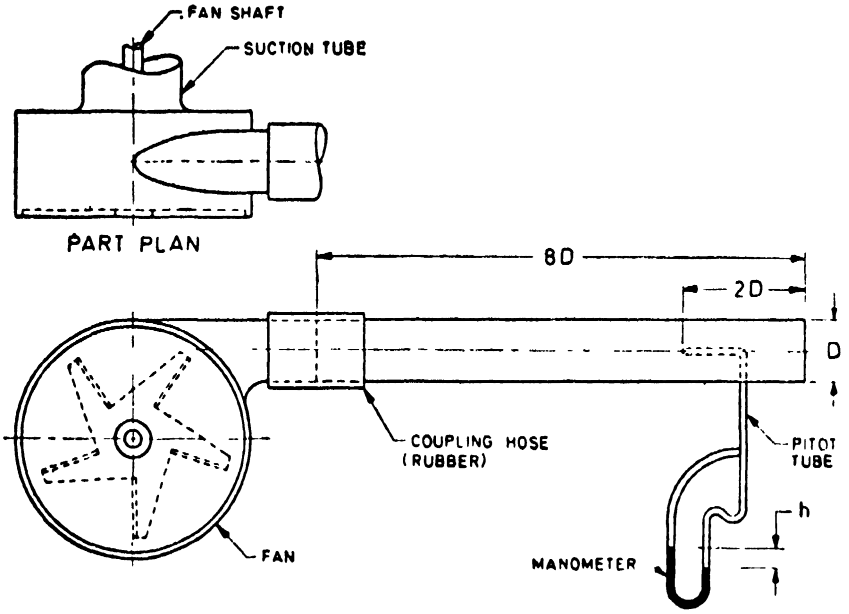

FIG. 1 DETERMINATION OF AIR OUTPUT OF THE DUSTER

5.1.2 Operate the fan at 35 ± 2 rev/min of crank handle and note the rise of water (h) in the manometer and calculate the air output by the following formula:

$$Q = cd \times A \times V$$

where

Q = air output in m^3/min,

cd = coefficient of discharge (0·8),

A = cross-sectional area of blower fan outlet in m^2,

V = mean flow velocity in m/min,

$V = 245 \sqrt{h}$, and

h = velocity pressure measured in the manometer in mm.

5.1.3 Repeat the above test for at least three times and average of the values obtained shall give the average air output of the blower fan.

5.2 *Test for Dust Delivery*

5.2.1 The hopper shall be filled up to three-fourth of its total capacity with talc powder (*see* **6.1.1**). The duster with all its working accessories shall be weighed to the nearest gram. The duster shall be fixed rigidly in place and then operated continuously and uniformly at a speed of 35 ± 2 rev/min of the crank handle and at the maximum discharge rate setting of the dust feed control mechanism for at least two minutes. The mass of the duster shall again be determined and the rate of discharge per minute determined.

5.2.2 Repeat the above test for at least three times and calculate the average discharge rate per minute.

Note — A period of pre-test usage may be applied to overcome variation in initial discharge.

5.3 *Test for Dust Throw*

5.3.1 The hopper shall be filled up to three-fourth of its total capacity with talc powder (*see* **6.1.1**). Set the duster and delivery pipe at its horizontal position. The dust deflector shall be removed. Operate the duster continuously and uniformly at a speed of 35 ± 2 rev/min of the crank handle. Measure the horizontal distance from the outermost point of the delivery pipe and the outermost point where dust falls on the ground.

5.3.2 Repeat the above test for at least three times and calculate the average horizontal distance.

Note — Dust delivery test (**5.2**) and dust throw test (**5.3**) may be done in one setting.

5.4 *Test for Leakage*

5.4.1 The hopper shall be filled up to three-fourth of its total capacity with talc powder (*see* **6.1.1**). Set the duster at its horizontal position and plug the blower fan outlet. Operate the duster at a speed of about 35 ± 2 rev/min for two minutes. No leakage of dust shall occur at any place in the duster during this test.

6. Test for Components

6.1 *Test for Agitation*

6.1.1 The hopper shall be filled up to three-fourth of its total capacity with talc powder used for insecticidal formulations. Minimum of 90 percent by mass of the talc powder shall pass through the 75-micron IS test sieve [*see* IS : 460-1985 Specification for test sieves (*third revision*)]. The bulk density after compacting, when tested, in accordance with **12.2** of IS : 6940-1982 'Method of test for pesticides and their formulations (*first revision*)' shall not exceed the value obtained before compacting, by more than 60 percent. The duster shall be fixed rigidly in place and shall be operated continuously and uniformly at a speed of 35 ± 2 rev/min of the crank handle and at medium discharge rate setting of feed control mechanism as specified by the manufacturer till the discharge at the outlet siezes. The duster shall be deemed to have passed the test, if upon the completion of test, not more than 500g of dust remains in the hopper.

Note — BS sieve 200, ASTM test sieve 200 and Tyler test sieve 200 have their apertures within the limits specified for 75-micron IS test sieve.

6.2 *Test for Dust Feed Control Mechanism*

6.2.1 The hopper shall be filled up to full of its total capacity with talc powder (*see* **6.1.1**). The duster with all its working accessories shall be weighed to the nearest gram. The duster shall be fixed rigidly in place and then operated continuously and uniformly at a speed of 35 ± 2 rev/min of the crank handle and at maximum, ¾, ½ and ¼ discharge rate settings of the feed control mechanism for at least two minutes in each setting of the feed control mechanism. The mass of the duster shall be determined after every change of discharge rate settings of the feed control mechanism. The total mass of the dust discharged at each setting shall be computed.

6.2.1.1 The above test shall be repeated for at least three times and calculate the average discharge rate in different settings of the feed control mechanism.

6.3 *Test for Strap and Its Assembly*

6.3.1 The hopper shall be filled with the talc powder (*see* **6.1.1**) to its total capacity. The duster shall be hung from a solid support by its straps, simulating its carriage by the operator. It shall be lifted to a height of 30 cm and allowed to drop and hang by the straps 25 times. The straps and their assembly shall be deemed to have passed this test if none of its parts (straps, brackets, etc) break during the test.

EXPLANATORY NOTE

Hand rotary dusters, on the basis of their mounting, are mainly of two types:

a) Belly mounted, and

b) Shoulder mounted.

The performance and constructional requirements of these dusters have been covered in IS : 5135 (Part 1)-1974 'Specification for hand rotary duster: Part 1 Belly-mounted type (*first revision*)' and IS : 5135 (Part 2)-1977 'Specification for hand rotary duster: Part 2 Shoulder-mounted type (*first revision*)'. These standards include requirements and their methods of tests. As the tests are common to these dusters, with a view to unify and to avoid repetition as well as to provide an easy reference, it has been found desirable to publish this standard.

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960 'Rules for rounding off numerical values (*revised*)'.

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